> soluble by transforming said polymer into a water-insoluble protonated form, ..."

Applicants submit that, based on the foregoing, the claims are supported by the written description.

Response to Advisory Action

In the Advisory Action, the Examiner contends that there is insufficient support in the specification of the cited phrase (with regard to the organic acids) in the specification as originally filed. The Examiner contends that paragraph 0030 fails to provide the support, because it states that it is the color ink (comprising the organic acid) that renders insoluble the pigment dispersion in the black ink, not the organic acid itself interacting with the styrene-maleic anhydride (page 2 of Advisory Action, third and fourth paragraphs).

Paragraph 0029 states that "bleed control and halo control can be implemented by using organic acids in the color inks", referring to U.S. Patent 5,785,743. Paragraph 0030 then states:

> "An ink-jet ink composition employing an organic acid component and having an appropriate pH will render insoluble the pigment dispersion in the black inks by transforming the SMA polymer into water-insoluble protonated form."

Paragraphs 0031 and 0032 further describe the examples of organic acids and their properties. One skilled in the art would clearly know that it is the organic acid in the color ink that is causing the insolubility.

Regarding the written description requirement, the courts have held that the subject matter of the later claim need not be described literally or "*in ipsis verbis*" in order for the specification to satisfy the description requirement. See, e.g., *Cordis Corp. v. Medtronic AVE, Inc.*, 339 F.3d 1352 (Fed. Cir.), reh'g denied 2003 U.S. App. LEXIS 22508 (2003); and *In re Lukach*, 442 F.2d 967, 969, 169 U.S.P.Q. 795, 796 (C.C.P.A. 1971).

As such, it is submitted that the support for the recitation of "said styrene-maleic anhydride copolymer interacts with said organic acids by rendering said polymer in said black ink insoluble by transforming said polymer into a water-insoluble protonated

form" may, indeed, be gleaned from the specification as originally filed and as understood in its totality.

Reconsideration of the rejection of Claims 1-19, 22-42, and 45-46, as amended, under 35 USC 112, first paragraph, is respectfully requested.

Claims 1-19, 22-42, and 45-46 are rejected under 35 USC 103(a) as being unpatentable over Parazak (U.S. Patent 6,281,267) in view of Zhu (U.S. Patent 5,889,083).

Both references have been extensively discussed in prior Office Actions and in Applicants' responses thereto.

Essentially, there is but one issue to consider, namely, whether it would have been obvious to one skilled in the art at the time of the invention to have combined the references.

The Examiner argues that it would have been obvious to combine the references. Early on, the Examiner admitted that the difference between Parazak and the present invention is the requirement in the claims of hydrolyzed styrene-maleic anhydride copolymer (Office Action dated May 13, 2005). The Examiner in that Action further stated that Zhu, which is drawn to ink jet ink, discloses the use of hydrolyzed styrene-maleic anhydride (SMAH) copolymer, and argued that the motivation for using such polymer is as a binder in order to fix the colorant of the ink to the substrate and to provide abrasion protection, citing Col. 4, lines 47-54 and 62-67, Col. 5, line 63, and Col. 6, lines 5-9 and 31-39.

Zhu specifically states:

> "The ink composition of the present invention comprises a binder resin. The binder resin is a film former which upon drying of the ink leaves a film on the colorant. The film thus formed is responsible for fixing the colorant to the substrate. The film, in combination with the wax and other ingredients of the ink composition, also provides the jet printed messages a measure of protection against abrasion." (Col. 4, lines 48-54)

Applicants note that the system of Zhu is directed to fixing the colorant of a single ink composition on a substrate, by forming a film on the colorant.

Such a disclosure, however, hardly suggests Applicants' solution to controlling bleed. Bleed is defined in the specification, paragraph 0003, as follows:

> "When inks of two different colors are printed next to each other, it is desired that the border between the two colors be clean and free from the invasion of one color into the other. When one color does invade into the other, the border between the two colors becomes ragged, and this is bleed."

Applicants' invention is directed to the use of color inks that are dye-based and black inks that are pigment-based. The dyes in the color inks are soluble in water, while the pigments in the black inks are insoluble in water. Nothing in Zhu discloses that SMAH would act to prevent bleed between color inks and black inks. While SMAH might fix the black inks to the substrate, as taught by Zhu, there is not the slightest disclosure or suggestion as to what effect, if any, SMAH might have on dyes in color inks. Indeed, Zhu is unconcerned with dye-based color inks, and instead employs pigment-based color inks, where bleed between color inks and black inks is of no concern.

Parazak uses a pigmented black and color ink as do Applicants, but the similarity ends there. The black ink in Parazak's system contains an acrylate polymer, while the black ink in Applicants' system contains SMAH. Given Zhu, the question is why would one be directed to trying SMAH in a Parazak-type of system when Zhu is using the material for fixing a pigment to a substrate and for abrasion resistance and no mention is ever made of black-to-color bleed. Zhu is not even employing an ink set that contains a black pigment-based ink and a color dye-based ink. In fact, Zhu's invention is just not the use of SMAH in the ink but the combination of SMAH ***and*** a wax in the ink to address abrasion. Nowhere does Zhu mention or even remotely suggest that the addition of SMAH to an ink could have additional benefits such as bleed control. The structures of SMAH of Zhu and the acrylates cited in Parazak are very different, so there is no logical reason to substitute one for the other, other than that both are compatible with aqueous systems and one might begin trying water soluble polymers in an effort to address the problem. However, the test is not "obvious to try". The same is true of Parazak.

Finally, while Zhu discloses black and color inks, there is no disclosure of ink-jet ink ***sets***, as claimed by Applicants. That is to say, there is not the slightest disclosure or suggestion of the effects of printing a pigment-based black ink adjacent a dye-based color ink.

The Examiner cites as the motivation to use SMAH the fact that the polymer is used as a binder by Zhu to fix the colorant of the ink to the substrate and to provide abrasion protection. However, fixing the colorant to the substrate in no way is suggestive of controlling black-to-color bleed. One skilled in the art, seeking to improve control of black-to-color bleed in a Parazak-type ink system (black pigment-based inks and color dye-based inks), would hardly consult Zhu (pigment-based inks only) for a solution to this problem.

It appears that the Examiner has found a reference in the inkjet art that employs SMAH and is trying to justify her position. However, first, the Examiner is impermissibly extracting bits and pieces from a reference (Zhu) to cobble together a facsimile of Applicants' claims, where Zhu is totally silent on black-to-color bleed. Contrary to the Examiner's assertion, there is, in fact, no motivation on the part of the artisan to employ the teachings of Zhu to improve control of black-to-color bleed.

It further appears that the Examiner is confusing fixing a pigment-based colorant to a substrate with controlling black-to-color bleed between black pigment-based ink and color dye-based ink. These are simply two quite disparate problems, and a solution to one problem is in no way suggestive of a solution to the other problem.

The Examiner is respectfully reminded of the requirements, set forth in MPEP 706.02(k), to establish a *prima facie* case of obviousness:

(1) There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

(2) There must be a reasonable expectation of success.

(3) The prior art references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on Applicants' disclosure.

Applicants submit that the Examiner has failed to establish the requisite *prima facie* case. Nothing in the references suggests modifying Parazak and nothing in the references suggests combining the teachings of Parazak and Zhu. Since no suggestion is made to combine the teachings, there can be no reasonable expectation of success. Finally, the references fail to teach all the claim limitations. As noted above,

the teaching by Zhu to fix a pigment-based colorant of the ink to the substrate and to provide abrasion protection utterly fails to suggest controlling black-to-color bleed between a pigment based-ink and a dye-based ink.

Response to Advisory Action

In the Advisory Action, the Examiner admits that there is no disclosure in Zhu of preventing color bleed between color inks and black inks, but argues that there is no recitation or requirement in the present claims regarding color bleed (page 3 of Advisory Action, second and third paragraphs).

With regard to independent Claim 24, the preamble of the claim, as filed in Applicants' Amendment under 37 CFR 1.116, states "A method of controlling bleed between a black pigment-based inkjet ink and a color inkjet ink". Applicants submit that this phrase satisfies the "recitation or requirement" condition set forth by the Examiner.

With regard to independent Claim 1, this claim has been amended to emphasize the resulting improvement of black-to-color bleed as described, for example, in paragraph 0017.

The Examiner argues that "although there is no disclosure that the organic acid or multivalent salt interacts with styrene-maleic anhydride to control black-to-color bleed, given that Parazak in combination with Zhu discloses ink as presently claimed, it is clear that the organic acid or salt would intrinsically interact with styrene-maleic anhydride to control bleed" (page 3 of the Advisory Action, fourth and fifth paragraphs).

Over the years, Applicants' employer, Hewlett-Packard Company, has expended considerable effort to control black-to-color bleed. Many inventions have been made in this area, and the Parazak invention is one of them. Parazak employs a pigmented black and color ink, wherein the black ink contains an acrylate polymer. The acrylate polymer interacts with either multi-valent salts or an organic acid to control black-to-color bleed.

Applicants found another way to control black-to-color bleed, namely, the interaction with either multi-valent salts or an organic acid with styrene-maleic anhydride. That Zhu uses styrene-maleic anhydride to fix the colorant to the substrate in

no way discloses or even remotely suggests that this compound, in conjunction with a multi-valent salt or an organic acid, could control black-to-color bleed between a self-dispersed black pigment ink and a dye-based color ink. Only with impermissible hindsight can the Examiner say that this reaction would "intrinsically" take place, given the failure of either Parazak or Zhu to teach this reaction and its effect on black-to-color bleed.

The Examiner notes that there is no disclosure in the present claims that the color inks comprise dyes (page 4 of the Advisory Action, first paragraph).

The independent claims are so amended; the basis for this is found in paragraph 0027. In this connection, Applicants' pigments are self-dispersed; see, e.g., paragraph 0022. Self-dispersed pigments do not require a separate dispersant, as do ordinary pigments. Zhu's pigments would appear to require a separate dispersant ("Some of the pigments and dyes are commercially available in convenient dispersions" – Col. 4, lines 22-23). Note also Col. 3, lines 29-31, reciting carbon black as a preferred pigment. It is well known that carbon black pigment requires a separate dispersant. Applicants' independent claims are amended to emphasize that their pigments are self-dispersed.

The Examiner argues that the open language of the claims, i.e., "comprising", opens the claims to the inclusion of additional ingredients including the acrylate polymer of Parazak and the wax of Zhu (page 4, third and fourth paragraph as to acrylate polymer and page 5, first full paragraph as to wax).

Applicants have amended the independent claims to recite "said polymer consists essentially of". This phraseology is understood to exclude other materials that would have a material affect on the properties of the ink set, such as the acrylate polymer of Parazak and the wax of Zhu.

Finally, the Examiner admits that "there is no disclosure that the organic acid or multivalent salt interacts with styrene-maleic anhydride to control black-to-color ink". Yet, the Examiner further states "given that Parazak in combination with Zhu discloses ink indentical to that presently claimed, it is clear that the organic acid or

salt would intrinsically interact with styrene-maleic anhydride to control bleed" (page 4, last paragraph and page 5, last two paragraphs).

This is a bootstrap argument. First, the Examiner impermissibly combines the two references, on the basis that Parazak teaches a polymer, specifically, an acrylate polymer, that in combination with an organic acid or multi-valent salt controls bleed and that Zhu teaches a polymer, namely, styrene-maleic anhydride resins that act to fix a colorant on a substrate. Yet, there is no teaching in either reference to suggest making the combination, particularly where Zhu require the presence of a wax in the ink jet composition.

Having impermissibly made the combination, the Examiner then states that it is clear that the organic acid or salt would "intrinsically" interact with styrene-maleic anhydride to control bleed, even while admitting that neither reference teaches this.

The rejection of Applicants' claims over the combination of Parazak and Zhu is devoid of the considerations required for the combination to disclose or suggest Applicants' claimed invention.

First, MPEP 2143.01(I) clearly states that "the prior art must suggest the desirability of the claimed invention". The Examiner has failed to show where in either reference the desirability of making the combination is taught.

Second, MPEP(III) clearly states that the "fact that references **can** be combined or modified is not sufficient to establish *prima facie* obviousness" (emphasis added). Having found a reference (Zhu) that discloses styrene-maleic anhydride in an inkjet ink, the Examiner then combines this reference with Parazak, ignoring the plain teachings of both references, one (Parazak) directed to acrylic polymers for controlling bleed and the other directed to fixing a colorant to a substrate (Zhu). Without more, there is simply no disclosure or suggestion that a fixing agent (colorant fixed to substrate) can act as a black-to-color bleed control agent (preventing invasion of one color by another).

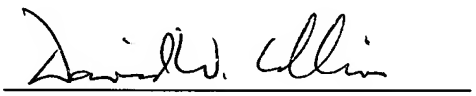
For at least the foregoing reasons, the claims are considered to be patentable over the combination of references.

Reconsideration of the rejection of Claims 1-19, 22-42, and 45-46, as amended, under 35 USC 103(a) as being unpatentable over Prazak in view of Zhu is respectfully requested.

The foregoing amendments and arguments are submitted to place the application in condition. The Examiner is respectfully requested to allow the application. If the Examiner has any questions, she is invited to contact the undersigned at the below-listed telephone number. HOWEVER, ALL WRITTEN COMMUNICATIONS SHOULD CONTINUE TO BE DIRECTED TO: IP ADMINISTRATION, LEGAL DEPARTMENT, M/S 35, HEWLETT-PACKARD COMPANY, P.O. BOX 272400, FORT COLLINS, CO 80527-2400.

Respectfully submitted,

August 28, 2006



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